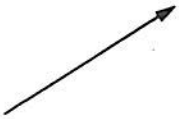
Name_____ **Vector** **Physics R**

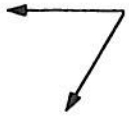
Mr. Greaves **Practice Exam**

1.

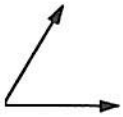


If the force vector shown in the diagram above is resolved into two components, these two components could best be represented by which diagram below?

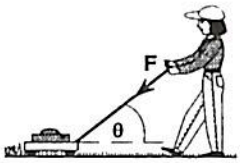
1) 

3) 

2) 

4) 

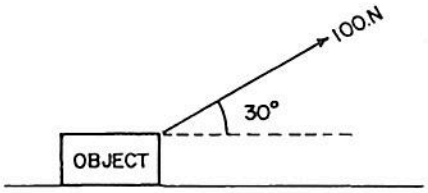
2. In the diagram below, a force, F, is applied to the handle of a lawnmower inclined at angle θ to the ground.



The magnitude of the horizontal component of force F depends on

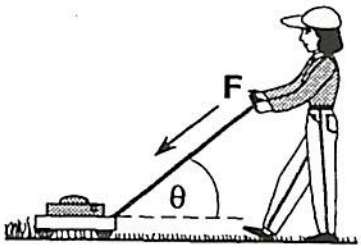
1) the magnitude of force F, only
2) the measure of angle θ, only
3) both the magnitude of force F and the measure of angle θ
4) neither the magnitude of force F nor the measure of angle θ

3. A force of 100. Newtons is applied to an object at an angle of 30° from the horizontal as shown in the diagram below. What is the magnitude of the vertical component of this force?



1) 0 N
2) 50.0 N
3) 86.7 N
4) 100. N

4. A lawnmower is pushed with a constant force of F, as shown in the diagram below:



As angle θ between the lawnmower handle and the horizontal increases, the horizontal component of F

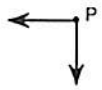
1) decreases
2) increases
3) remains the same

5. The diagram at the right represents a force acting at point P. Which pair of concurrent forces would produce equilibrium when added to the force acting at point P?

1) 

3) 

2) 

4) 

6. The speedometer in a car does not measure the car's velocity because velocity is a

1) vector quantity and has a direction associated with it
2) vector quantity and does not have a direction associated with it
3) scalar quantity and has a direction associated with it
4) scalar quantity and does not have a direction associated with it

7. A 5.0-newton force could have perpendicular components of

1) 1.0 N and 4.0 N
2) 2.0 N and 3.0 N
3) 3.0 N and 4.0 N
4) 5.0 N and 5.0 N

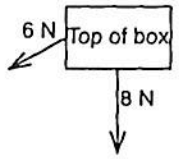
8. As the angle between a force and level ground decreases from 60° to 30°, the vertical component of the force

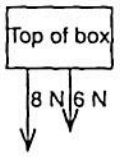
1) decreases
2) increases
3) remains the same

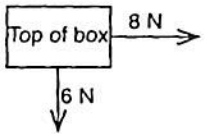
9. A girl attempts to swim directly across a stream 15 meters wide. When she reaches the other side, she is 15 meters downstream. The magnitude of her displacement is closest to

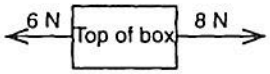
1) 30 m
2) 21 m
3) 17 m
4) 15 m

10. A 6-newton force and an 8-newton force act concurrently on a box located on a frictionless horizontal surface. Which top-view diagram shows the forces producing the *smallest* magnitude of acceleration of the box?

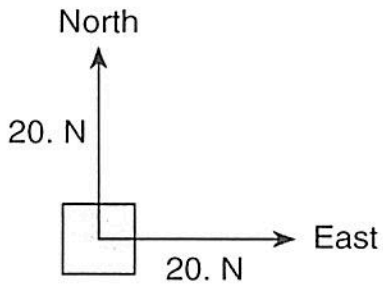
1) 

2) 

3) 

4) 

11. In the diagram below, a 20.-newton force due north and a 20.-newton force due east act concurrently on an object, as shown in the diagram below.



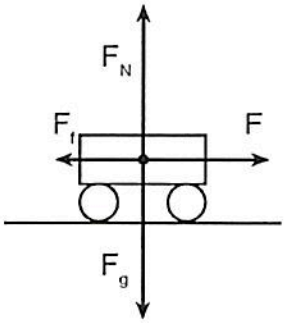
The additional force necessary to bring the object into a state of equilibrium is

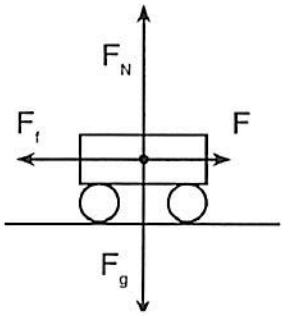
1) 20. N, northeast
2) 20. N, southwest
3) 28 N, northeast
4) 28 N, southwest

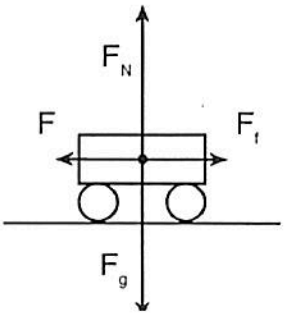
12. A child walks 5.0 meters north, then 4.0 meters east, and finally 2.0 meters south. What is the magnitude of the resultant displacement of the child after the entire walk?

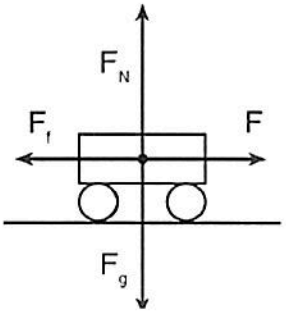
1) 1.0 m
2) 5.0 m
3) 3.0 m
4) 11.0 m

13. Which vector diagram best represents a cart slowing down as it travels to the right on a horizontal surface?

1) 

2) 

3) 

4) 

14. A 5.0-newton force and a 7.0-newton force act concurrently on a point. As the angle between the forces is increased from 0° to 180°, the magnitude of the resultant of the two forces changes from
    1) 0.0 N to 12.0 N
    2) 2.0 N to 12.0 N
    3) 12.0 N to 2.0 N
    4) 12.0 N to 0.0 N

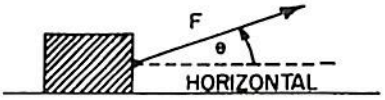
15. The diagram below represents a 5.0-newton force and a 12-newton force acting on point P.

    The resultant of the two forces has a magnitude of
    1) 5.0 N
    2) 7.0 N
    3) 12 N
    4) 13 N

16. Which pair of concurrent forces could produce a resultant force having a magnitude of 10. Newtons?
    1) 10. N. 10. N
    2) 10. N. 30. N
    3) 4.7 N. 4.7 N
    4) 4.7 N. 5.0 N

17. A force of 3 Newtons and a force of 5 Newtons act concurrently to produce a resultant of 8 Newtons. The angle between the forces must be
    1) 0°
    2) 60°
    3) 90°
    4) 180°

18. The diagram below represents a constant force F acting on a box located on a frictionless horizontal surface.



    As the angle between the force and the horizontal increases, the acceleration of the box will
    1) decrease
    2) increase
    3) remain the same

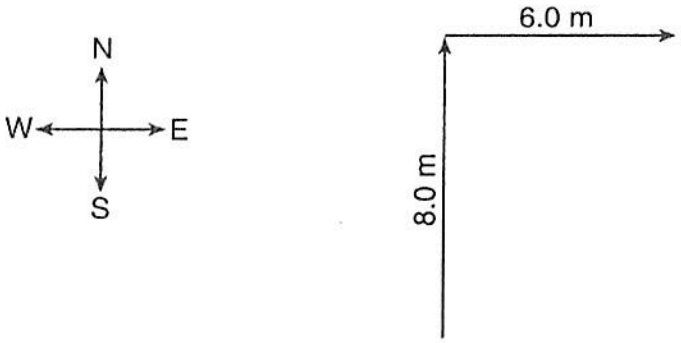
19. A car is driven from Buffalo to Albany and on to New York City, as shown in the diagram below.

    Compared to the magnitude of the car's total displacement, the distance driven is
    1) shorter
    2) longer
    3) the same

20. Which is a vector quantity?
    1) displacement
    2) mass
    3) speed
    4) energy

Base your answers to questions **1** and **2** on the information and vector diagram below.

A dog walks 8.0 meters due north and then 6.0 meters due east.



1. Using a metric ruler and the vector diagram, determine the scale used in the diagram.

2. On the diagram above, construct the resultant vector that represents the dog's total displacement.

3. Base your answers to parts a through c on the information below.

A newspaper carrier on her delivery route travels 200. meters due north and then turns and walks 300. meters due east.

a Draw a vector diagram following the directions below.
(1) Using a ruler and protractor and starting at point P, construct the sequence of two displacement vectors for the newspaper carrier's route. Use a scale of 1.0 centimeter = 50. meters. Label the vectors.
(2) Construct and label the vector that represents the carrier's resultant displacement from point P.

b What is the magnitude of the carrier's resultant displacement?

c What is the angle (in degrees) between north and the carrier's resultant displacement?

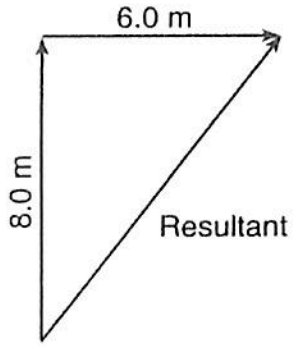
Vector
Answer Key
[New Exam]

1. 4
2. 3
3. 2
4. 1
5. 4
6. 1
7. 3
8. 1
9. 2
10. 4
11. 4
12. 2
13. 2
14. 3
15. 4
16. 1
17. 1
18. 1
19. 2
20. 1

Vector
Answer Key
[New Exam]

1. .0 cm = 2.0 m ± 0.2 m

2.



3. A) Drawings; B) 361 m (±) 15 m ; C) 56° (±) 2°